HW4 (Due 2018/04/02)

1. Every positive integer greater than 1 can be expressed as product of prime numbers. This factorization is unique and is called the **prime factorization**. For example, the number 60 can be decomposed into the factors 2x2x3x5, each of which is prime. Note that the same prime can appear more than once in the factorization. Write a C++ program to display the prime factorization of a given integer *n*, where $2 \leq n \leq 32767$.

   Sample I/O : (The italics for program output and boldfaces for user input)

   ```
   Please input an integer: 60
   The prime factorization of 60:
   6 = 2*2*3*5.
   ```

   Bonus:

   1. Write a function ***int MinFact***(***int n***) that returns the minimum prime factor of ***n*** . Use this function in your program.

2. A point (a, b) in the plane is said to **dominate** point (c, d) in the plane if $a > c$ and $b > d$. Given a set $S = \{(x_1, y_1), (x_2, y_2), (x_3, y_3), \ldots, (x_n, y_n)\}$ of n points in the plane, the **rank** of a point $p \in S$ is the number of points in S which are dominated by p. For instance, If $S = \{(1, 0), (2, 1), (3, 1), (4, 3), (3, 4)\}$, the rank of point (4, 3) is 3 and the rank of (3, 1) is 1. Write a C++ program to find the ranks of a set $\{(x_1, y_1), (x_2, y_2), (x_3, y_3), \ldots, (x_n, y_n)\}$ of n points in the plane, where $1 \leq n \leq 32767$ and $-32768 \leq x_i, y_i \leq 32767$ for $1 \leq i \leq n$.

   Sample I/O : (The italics for program output and boldfaces for user input)

   ```
   Please input n: 5
   Please input 5 points:
   1 0
   2 1
   3 1
   4 3
   3 4
   The rank of point (1, 0): 0
   The rank of point (2, 1): 1
   The rank of point (3, 1): 1
   The rank of point (4, 3): 3
   The rank of point (3, 4): 2
   ```

   Bonus:

   List the results in the non-increasing order.

Sample I/O : (The italics for program output and boldfaces for user input)

```
Please input n: 5
Please input 5 points:
1 0
2 1
3 1
4 3
3 4
The rank of point (4, 3): 3
The rank of point (3, 4): 2
The rank of point (2, 1): 1
The rank of point (3, 1): 1
The rank of point (1, 0): 0
```